Retzian-(Nd)  
\((\text{Mn}^{2+}, \text{Mg})_2(\text{Nd}, \text{La}, \text{Ce})\text{(AsO}_4\text{)}\text{(OH)}_4\)

**Crystal Data:** Orthorhombic.  
**Point Group:** 2/m 2/m 2/m.  
Crystals, to 3 mm, elongated along [100], showing principally {010}, {001}, {110}, {201}, {130}; commonly in parallel aggregates.  
**Twinning:** Radial, spokelike, trillings or sixlings, rare.

**Physical Properties:**  
**Fracture:** Uneven.  
Hardness = 3–4  
D(meas.) = > 4.2  
D(calc.) = 4.45

**Optical Properties:**  
Semitransparent.  
**Color:** Pinkish brown to reddish brown, zoned darker in the center.  
**Streak:** Very pale brown.  
**Luster:** Vitreous to dull.  
**Optical Class:** Biaxial (+).  
**Pleochroism:** X = yellow; Y = reddish brown; Z = brown.  
**Orientation:** X = c; Y = b; Z = a.  
**Dispersion:** r<v , weak.  
**Absorption:** Z > Y ≫ X.

\[\alpha = 1.774(2) \quad \beta = 1.782(2) \quad \gamma = 1.798(2) \quad 2V(\text{meas.}) = 69(1)° \quad 2V(\text{calc.}) = 71°\]

**Cell Data:**  
**Space Group:** Pban.  
\[a = 5.690(5) \quad b = 12.12(1) \quad c = 4.874(3) \quad Z = 2\]

**X-ray Powder Pattern:** Sterling Hill, New Jersey, USA; very similar to retzian-(Ce) and retzian-(La).

2.726 (100), 3.534 (60), 4.89 (30), 1.857 (30), 6.05 (20), 1.625 (20), 1.463(20)

**Chemistry:**

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<th>Element</th>
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<th>Atomic</th>
<th>(1)</th>
<th>Atomic</th>
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<td>Eu_2O_3</td>
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<td>Total</td>
<td>[102.6]</td>
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</table>

(1) Sterling Hill, New Jersey, USA; by electron microprobe, total Mn as MnO, H_2O by DTA-TGA on a separate sample of retzian-(Ce); corresponds to (Mn_{1.63}Mg_{0.22}Zn_{0.10}Fe_{0.03})Σ=1.98(Nd_{0.29}La_{0.21}Ce_{0.21}Pr_{0.11}Sm_{0.07}Y_{0.06}Gd_{0.05}Eu_{0.02})Σ=1.03(AsO_4)_{1.04}(OH)_{3.90}.

**Occurrence:** A very rare late phase in fractures in a metamorphosed stratiform zinc orebody.

**Association:** Rhodochrosite, kraisslite, sonolite, zincite, sphalerite, chlorophoenicite, willemite, franklineite, calcite, barite.

**Distribution:** From Sterling Hill, Ogdensburg, Sussex Co., New Jersey, USA.

**Name:** For its dominant rare earth, neodymium, and relation to retzian-(Ce).


**References:**  
(2) Moore, P.B. (1967) Crystal chemistry of the basic manganese arsenate minerals 1. The crystal structures of flinkite, Mn_2^{2+}Mn^{3+}(OH)_4(AsO_4) and retzian, Mn_2^{2+}Y^{3+}(OH)_4(AsO_4). Amer. Mineral., 52, 1603–1613.